

1007 Rec'd PCT/PTO 06 MAR 2007

FORM PTO-1590 (REV. 12-2001)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			AGFA 250-KFM U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <b>10/070405</b>
INTERNATIONAL APPLICATION NO. PCT/EP00/08759	INTERNATIONAL FILING DATE 7/SEPTEMBER/2000	PRIORITY DATE CLAIMED 7/SEPTEMBER/1999	
TITLE OF INVENTION DEVICE, METHOD AND SYSTEM FOR GENERATING IMAGES			
APPLICANT(S) FOR DO/EO/US <b>Hans-Juergen Rauh, Hans-Georg Schindler and Norbert Strommer</b>			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information			
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under <u>35 U.S.C. 371</u></p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371</p> <p>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31)</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau)</p> <p>b. <input type="checkbox"/> has been communicated by the International Bureau</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input checked="" type="checkbox"/> is attached hereto</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4)</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau)</p> <p>b. <input type="checkbox"/> have been communicated by the International Bureau</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input checked="" type="checkbox"/> have not been made and will not be made</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p><b>Items 11 to 20 below concern document(s) or information included:</b></p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included</p> <p>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</p> <p>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4)</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input type="checkbox"/> Other items or information</p>			

U.S. APPLICATION NO. <b>10/070405</b>		INTERNATIONAL APPLICATION NO. <b>PCT/EP00/08759</b>		ATTORNEY'S DOCKET NUMBER <b>AGEA 250-KEM</b>	
21. <input type="checkbox"/> The following fees are submitted <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. . . . . <b>\$1040.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . . . <b>\$890.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . <b>\$740.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . . <b>\$710.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) . . . . . <b>\$100.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS PTO USE ONLY</b>         <b>\$ 890.00</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e))				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	21 - 20 =	1	x \$18.00	\$ 180.00	
Independent claims	6 - 3 =	3	x \$84.00	\$ 252.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$280.00	\$
<b>TOTAL OF ABOVE CALCULATIONS</b>				<b>=</b>	<b>\$1,160.00</b>
<input type="checkbox"/> Applicant claims small entity status See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				+	\$
<b>SUBTOTAL</b>				<b>=</b>	<b>\$1,160.00</b>
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f))				\$	
<b>TOTAL NATIONAL FEE</b>				<b>=</b>	<b>\$1,160.00</b>
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) <b>\$40.00</b> per property +				\$	
<b>TOTAL FEES ENCLOSED</b>				<b>=</b>	<b>\$1,160.00</b>
				Amount to be refunded:	\$
				charged:	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>1,160.00</u> to cover the above fees is enclosed  b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees A duplicate copy of this sheet is enclosed  c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>50-0427</u> A duplicate copy of this sheet is enclosed  d. <input type="checkbox"/> Fees are to be charged to a credit card. <b>WARNING:</b> Information on this form may become public <b>Credit card</b> <b>information should not be included on this form</b> Provide credit card information and authorization on PTO-2038					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status. EXPRESS MAIL MAILING LABEL SEND ALL CORRESPONDENCE TO number <u>ET 968 873 24425</u> Date of Deposit <u>3-6-02</u> <b>MILDE, HOFFBERG &amp; MACKLIN, LLP</b> <b>10 BANK STREET</b> <b>SUITE 460</b> <b>WHITE PLAINS, NEW YORK 10606</b> Date of Deposit <u>3-6-02</u> Signature <u>Karl F. Milde, Jr.</u> NAME <u>24,822</u> REGISTRATION NUMBER					

AGFA 250-KFM  
MU 99011-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : HANS-JUERGEN RAUH, HANS-GEORG SCHINDLER  
and NORBERT STROMMER  
  
Serial No. : TO BE ASSIGNED  
  
Filed : HEREWITH  
  
For : DEVICE, METHOD AND SYSTEM FOR GENERATING  
IMAGES  
-----

Hon. Commissioner of Patents  
& Trademarks  
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to examination, please amend the above-identified  
patent application as follows:

IN THE TITLE:

Please change the title of the application to read as  
follows:

METHOD AND APPARATUS FOR GENERATING IMAGES ON  
PHOTOGRAPHIC MATERIAL

IN THE SPECIFICATION:

On page 1, after the title, insert the following  
heading:

## BACKGROUND OF THE INVENTION;

On page 1, please change lines 1-3 to read as follows:

The invention relates to a method and to printer apparatus for producing photographic images on strip-shaped photographic material and thereafter cutting the photographic material to individual picture lengths.

On page 6, before line 1, insert the following heading:

## SUMMARY OF THE INVENTION;

and change lines 5 and 6 to read as follows:

This object, as well as other objects which will become apparent from the discussion that follows, are achieved, according to the present invention, by providing printer apparatus comprising:

(a) a projector device for projecting image information for a plurality of photographic pictures onto strip-shaped photographic material, and for projecting marks onto the photographic material that indicate the positions for cutting the material; and

(b) a controller, coupled to the projector device, for producing control signals to cause the projection of said marks onto the photographic material.

On page 10, delete lines 13-16 in their entirety and substitute the following paragraph and heading:

For a full understanding of the present invention, reference should now be made to the following detailed description of the preferred embodiments of the invention as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS;

and change lines 17-21 to read as follows:

Figure 1 shows an embodiment of the invention in a system used to generate photographic images.

Figure 2 shows a section of strip-shaped photographic material onto which the marks are projected.

On page 11, change lines 1-8 to read as follows:

Figure 3 shows a further example of the strip-shaped photographic material onto which the marks are projected that are configured as encoded marks.

Figure 4 shows a third example of the strip-shaped photographic material onto which test data and a mark to designate the test data are projected.

Figure 5 shows an embodiment of a system to generate photographic images based on the invention.

On page 11, delete lines 9-11, insert the following heading and paragraph:

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention will now be described with reference to Figs. 1-5 of the drawings. Identical elements in the various figures are designated with the same reference numerals.

On page 32, after the last line, insert the following paragraph:

There has thus been shown and described a novel method and apparatus for generating images on photographic material which fulfills all the objects and advantages sought therefor. Many changes, modifications, variations and other uses and applications of the subject invention will,

however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention, which is to be limited only by the claims which follow.

IN THE CLAIMS:

In line 1, delete "Patent Claims:" and insert:

C L A I M S

What is claimed is:

Please cancel claims 1-21 and substitute the following new claims 22-42:

22. Printer apparatus for producing images, comprising, in combination:

(a) a projector device for projecting image information for a plurality of photographic pictures onto strip-shaped photographic material, and for projecting marks onto the photographic material that indicate the positions for cutting the material; and

- (b) a controller, coupled to the projector device, for producing control signals to cause the projection of said marks onto the photographic material.
23. Apparatus as in claim 22, wherein said marks contain information in addition to indicating the positions for cutting the photographic material.
24. Apparatus as in claim 23, wherein said marks include at least one of a beginning-of-order and end-of-order indication, thereby indicating at least one of the first and last picture of an order for printing photographs.
25. Apparatus for producing photographic images, comprising in combination:
- (a) a projector device for projecting, onto strip-shaped photographic material, image information for a plurality of photographic pictures, photographic test information as well as marks that designate the test information; and
  - (b) a controller device, coupled to the projector device, for producing control signals to cause the



projector device to project said marks, such that the projection of image information may be monitored by means of the test information.

26. Device as in claim 25, wherein said marks include at least one piece of information which identifies the printer apparatus.

27. Apparatus as in claim 25, said the marks include at least one bar code.

28. Apparatus as in claim 25, wherein the test information includes a plurality of gray-scale shades.

29. Apparatus as in claim 25, wherein the controller device is further operative to generate control signals to cause the projection of marks that may be used for cutting the strip-shaped photographic material, and wherein the projector device is operative, in dependence upon said control signals, to project such marks onto the photographic material.

30. Apparatus as in claim 24, wherein the projector device projects the image information row by row.

31. Apparatus as in claim 24, wherein the projector device includes exposure means for exposing the light-sensitive photographic material to said image information.

32. Apparatus as in claim 31, wherein the projector device includes a plurality of lasers for exposing said image information.

33. Apparatus as in claim 24, further comprising transport means for transporting the strip-shaped photographic material into a printing area of the projection device, and wherein the projector device is so configured that the marks are accurately projected onto the strip-shaped photographic material when the transport means transports the strip-shaped photographic material into the printing area thereof.

34. In printer apparatus for producing photographic images, comprising, in combination:

(a) a projector unit for projecting image information for a plurality of photographic pictures onto strip-shaped photographic material;

(b) a control unit; coupled to the projector unit, for controlling the projector unit;

the improvement wherein the control unit produces control signals and transmits the control signals to the projector unit, and wherein the projector unit projects the marks which exactly indicate the positions for cutting the photographic material onto the strip-shaped photographic material in response to the control signals received from the control unit.

35. In a printing device for producing images in which image information associated with a plurality of pictures as well as test information are projected onto strip-shaped photographic material by means of a projector unit;

the improvement comprising a controller unit coupled to the projector unit, for producing control signals for causing the projector unit to project marks that may be used to designate test information;

whereby the projection of the image information may be monitored via the test information; and whereby both the test information and the marks used to designate test

information are projected onto the strip-shaped photographic material by the projector unit in dependence upon the control signals.

36. A system for generating images, comprising:

(a) a printing device in accordance with claim 23;

(b) a detector for detecting said marks projected onto strip-shaped photographic material; and

(c) a cutter for cutting the strip-shaped photographic material onto which the image information was projected to form individual pictures;

said cutter being operative to cut the strip-shaped photographic material, in dependence upon detection of the marks by the detector, directly at those positions at which the marks are projected onto the strip-shaped photographic material.

37. System as in claim 36, wherein the detector is positioned adjacent to the cutter.

38. System as in claim 36, further comprising a sorter to sort the individual pictures in dependence upon the additional information in the encoded marks.

39. A system for generating images comprising, in combination:

- (a) a printing device in accordance with claim 25;
- (b) an evaluator for evaluating the test information projected onto the strip-shaped photographic material;
- (c) a detector for detecting the marks projected onto the strip-shaped photographic material that designate the test information; and
- (d) an adjustor for adjusting the projection of the image information via the printing device in dependence upon the evaluation of the test information and the detection of the marks used to designate the test information.

40. System as in claim 39, further comprising a plurality of said printing devices.

41. System as in claim 39, wherein the evaluator is connected with the printing device via a network.

42. System as in claims 39, wherein the evaluator is a densitometer.

IN THE ABSTRACT:

Please add the ABSTRACT OF THE DISCLOSURE on the attached sheet.

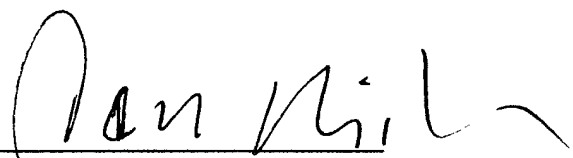
R E M A R K S

This Preliminary Amendment is being filed to place the specification and claims in proper form under United States Patent Practice and to add an Abstract of the Disclosure.

No new matter has been introduced by this Amendment.

Respectfully submitted,

By

  
Karl F. Milde, Jr.  
Reg. No. 24,822

MILDE & HOFFBERG, LLP  
10 Bank Street - Suite 460  
White Plains, NY 10606

(914) 949-3100

## ABSTRACT OF THE DISCLOSURE

The invention relates to a device (20) and method for generating images and to a system (10; 140) for producing images. The aim of the invention is to enable a simple and inexpensive generation of images and marks on strip-shaped recording material and thus to enable an effective production of images. To this end, an output unit (13) is provided for outputting image information onto strip-shaped recording material (22). The image information is assigned to a plurality of images. Drive signals for applying marks (34, 36-39) which can be used for a cutting of the strip-shaped recording material (22) can be generated by a control means (15). The invention also provides that marks (54) can be generated which serve to denote test information (57). This test information is used for verifying the output of the image information. The output unit (13) is connected to the control means (15) in order to receive the drive signals. The output unit (13) is configured in such a way that, according to the drive signals, it additionally applies marks (34, 36-39), which can be used for cutting, onto the strip-shaped recording material (22). The output unit (13) can additionally or alternatively output the marks



(54), which denote the test information (57), and can output the test information (57) itself.

VERSION TO SHOW MARKINGS OF CHANGES MADE

IN THE TITLE:

Please change the title of the application to read as follows:

-- METHOD AND APPARATUS FOR GENERATING IMAGES ON  
PHOTOGRAPHIC MATERIAL --.

IN THE SPECIFICATION:

On page 1, after the title, insert the following heading:

-- BACKGROUND OF THE INVENTION;

On page 1, lines 2-5, change "The invention relates to a device and method to generate photographic images per the overall concepts of Patent Claims 1 and 4 or 13 and 14, as well as a system to generate such images" to -- The invention relates to a method and to printer apparatus for generating photographic images on strip-shaped photographic material and thereafter cutting the photographic material to individual picture lengths . --

On page 6, before line 1, insert the following heading:

-- SUMMARY OF THE INVENTION --;

and delete lines 5 and 6 and insert -- This object, as well as other objects which will become apparent from the discussion that follows, are achieved, according to the present invention, by providing printer apparatus comprising:

(a) a projector device for projecting image information for a plurality of photographic pictures onto strip-shaped photographic material, and for projecting marks onto the photographic material that indicate the positions for cutting the material; and

(b) a controller, coupled to the projector device, for producing control signals to cause the projection of said marks onto the photographic material.--.

On page 10, delete lines 13-16 in their entirety and substitute the following paragraph and heading:

-- For a full understanding of the present invention, reference should now be made to the following detailed

description of the preferred embodiments of the invention as illustrated in the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS; --

line 17, after "Figure 1", insert -- shows --; line 18, after "generate", insert -- photographic -- line 19, after "Figure 2", change "an example of" to -- shows -- and after "projected", changed "," to -- . --.

On page 11, lines 1, after "Figure 3", insert -- shows -- line 3, change "," to -- . --; line 4, after "Figure 4", insert -- shows --; line 6, change ", and" to -- . --; line 7, after "Figure 5", insert -- shows --; after "generate", insert -- photographic --; delete lines 9-11 and insert the following heading and paragraph:

#### -- DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention will now be described with reference to Figs. 1-5 of the drawings. Identical elements in the various figures are designated with the same reference numerals. --

On page 32, after the last line, insert the following paragraph:

-- There has thus been shown and described a novel method and apparatus for generating images on photographic material which fulfills all the objects and advantages sought therefor. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention, which is to be limited only by the claims which follow. --

IN THE CLAIMS:

In line 1, delete "Patent Claims:" and insert:

C L A I M S

What is claimed is:

Please cancel claims 1-21 and substitute the following new claims 22-42:

-- 22. Printer apparatus for producing images, comprising,  
in combination:

(a) a projector device for projecting image information  
for a plurality of photographic pictures onto strip-  
shaped photographic material, and for projecting marks  
onto the photographic material that indicate the  
positions for cutting the material; and

(b) a controller, coupled to the projector device, for  
producing control signals to cause the projection of  
said marks onto the photographic material.

23. Apparatus as in claim 22, wherein said marks contain  
information in addition to indicating the positions for  
cutting the photographic material.

24. Apparatus as in claim 23, wherein said marks include at  
least one of a beginning-of-order and end-of-order  
indication, thereby indicating at least one of the first and  
last picture of an order for printing photographs.

25. Apparatus for producing photographic images, comprising  
in combination:

- (a) a projector device for projecting, onto strip-shaped photographic material, image information for a plurality of photographic pictures, photographic test information as well as marks that designate the test information; and
- (b) a controller device, coupled to the projector device, for producing control signals to cause the projector device to project said marks, such that the projection of image information may be monitored by means of the test information.
26. Device as in claim 25, wherein said marks include at least one piece of information which identifies the printer apparatus.
27. Apparatus as in claim 25, said the marks include at least one bar code.
28. Apparatus as in claim 25, wherein the test information includes a plurality of gray-scale shades.
29. Apparatus as in claim 25, wherein the controller device is further operative to generate control signals to cause

the projection of marks that may be used for cutting the strip-shaped photographic material, and wherein the projector device is operative, in dependence upon said control signals, to project such marks onto the photographic material.

30. Apparatus as in claim 24, wherein the projector device projects the image information row by row.

31. Apparatus as in claim 24, wherein the projector device includes exposure means for exposing the light-sensitive photographic material to said image information.

32. Apparatus as in claim 31, wherein the projector device includes a plurality of lasers for exposing said image information.

33. Apparatus as in claim 24, further comprising transport means for transporting the strip-shaped photographic material into a printing area of the projection device, and wherein the projector device is so configured that the marks are accurately projected onto the strip-shaped photographic material when the transport means transports the strip-shaped photographic material into the printing area thereof.



34. In printer apparatus for producing photographic images, comprising, in combination:

(a) a projector unit for projecting image information for a plurality of photographic pictures onto strip-shaped photographic material;

(b) a control unit; coupled to the projector unit, for controlling the projector unit;

the improvement wherein the control unit produces control signals and transmits the control signals to the projector unit, and wherein the projector unit projects the marks which exactly indicate the positions for cutting the photographic material onto the strip-shaped photographic material in response to the control signals received from the control unit.

35. In a printing device for producing images in which image information associated with a plurality of pictures as well as test information projected onto strip-shaped photographic material by means of a projector unit;

the improvement comprising a controller unit coupled to the projector unit, for producing control signals for causing the projector unit to project marks that may be used to designate test information;

whereby the projection of the image information may be monitored via the test information; and whereby both the test information and the marks used to designate test information are projected onto the strip-shaped photographic material by the projector unit in dependence upon the control signals.

36. A system for generating images, comprising:

- (a) a printing device in accordance with claim 23;
- (b) a detector for detecting said marks projected onto strip-shaped photographic material; and
- (c) a cutter for cutting the strip-shaped photographic material onto which the image information was projected to form individual pictures;

said cutter being operative to cut the strip-shaped photographic material, in dependence upon detection of the

marks by the detector, directly at those positions at which the marks are projected onto the strip-shaped photographic material.

37. System as in claim 36, wherein the detector is positioned adjacent to the cutter.

38. System as in claim 36, further comprising a sorter to sort the individual pictures in dependence upon the additional information in the encoded marks.

39. A system for generating images comprising, in combination:

(a) a printing device in accordance with claim 25;

(b) an evaluator for evaluating the test information projected onto the strip-shaped photographic material;

(c) a detector for detecting the marks projected onto the strip-shaped photographic material that designate the test information; and

(d) an adjustor for adjusting the projection of the image information via the printing device in dependence

upon the evaluation of the test information and the detection of the marks used to designate the test information.

40. System as in claim 39, further comprising a plurality of said printing devices.

41. System as in claim 39, wherein the evaluator is connected with the printing device via a network.

42. System as in claims 39, wherein the evaluator is a densitometer. --

IN THE ABSTRACT:

Please add the ABSTRACT OF THE DISCLOSURE on the attached sheet.

ABSTRACT OF THE DISCLOSURE

The invention relates to a device (20) and method for generating images and to a system (10; 140) for producing images. The aim of the invention is to enable a simple and inexpensive generation of images and marks on strip-shaped recording material and thus to enable an effective production of images. To this end, an output unit (13) is provided for outputting image information onto strip-shaped

recording material (22). The image information is assigned to a plurality of images. Drive signals for applying marks (34, 36-39) which can be used for a cutting of the strip-shaped recording material (22) can be generated by a control means (15). The invention also provides that marks (54) can be generated which serve to denote test information (57). This test information is used for verifying the output of the image information. The output unit (13) is connected to the control means (15) in order to receive the drive signals. The output unit (13) is configured in such a way that, according to the drive signals, it additionally applies marks (34, 36-39), which can be used for cutting, onto the strip-shaped recording material (22). The output unit (13) can additionally or alternatively output the marks (54), which denote the test information (57), and can output the test information (57) itself.

4/p r/r

DEVICE, METHOD AND SYSTEM FOR GENERATING IMAGES

The invention relates to a device and a method to generate photographic images per the overall concepts of Patent Claims 1 and 4 or 13 and 14, as well as to a system to generate such images.

So-called high-performance photographic printers are particularly used for the generation and production of images with which image information may be projected onto photographic material at high speed. The photographic material used is normally strip-shaped photographic paper that is supplied as a roll from a cassette to the high-performance printer. After the image information assigned to several pictures has been projected onto the strip-shaped photographic material, the numerous images transferred onto the strip-shaped photographic material are cut into separate photographs in a cutter in a subsequent step. Also, marks that are used by the cutter to cut the strip-shaped photographic material into individual photographs are placed on the strip-shaped photographic material.

It is known from the U.S. Patent No. 4,088,404 to project original images contained in photographic negatives using a

projection unit onto strip-shaped photographic material. According to the device known from this patent, the projection unit is an illumination unit with which individual photographic negatives are projected onto photographic paper in sequence. The known device contains a separate marking means with which the marks used for cutting are projected onto the photographic material. This marking means is positioned after the transfer unit so that an individual image is first projected onto the strip-shaped photographic material, then the corresponding mark used by the cutter is placed after the previously-transferred image, and finally the subsequent image is projected after the mark. According to this U.S. Patent No. 4,088,404, the marking means used is both a punching press to punch holes or indentations in the strip-shaped photographic material, as well as an additional projector with which the marks may be projected onto the strip-shaped photographic material. The known device uses a special marking means by means, of which only those marks are projected based on a previously-projected image. In particular, an inconvenient adaptation of the function of the marking means and its transfer of the mark onto the previously-performed projection of an image is necessary via the separate projection unit.

Recently, digital exposure units have been increasingly used as projection units to project image information. Such an exposure unit is known, for example, from the European Patent No. EP 0 922 993 A1. This known exposure unit includes lasers by means of which strip-shaped photographic material is exposed. Digital image data that contain the image information to be exposed are supplied to the lasers. From the European Patent No. EP 0 922 993 A1 it is also known to cut the strip-shaped photographic material, onto which the image information from several images are exposed, into individual photographs in a subsequent processing step. How the cutting of the strip-shaped photographic material is performed within the cutting unit is not described.

A method and a device to project image information onto strip-shaped photographic material, and to cut this strip-shaped photographic material, are known from the European Patent No. EP 0 947 880 A1. In this, data regarding the images or numerous images belonging to a group that are already available during projection of the image information onto the photographic material readable by machine may be projected onto the photographic material together. These data are projected onto the photographic



material in the form of special marks, e.g., a bar code, by means of the same projection unit that projects the image information. These marks, i.e., barcodes, particularly contain information regarding the height and width of the image. With the known device and the known method, several images are usually projected adjacent onto the strip-shaped photographic material. Further, the quantity of adjacent images and their position relative to a reference point such as the longitudinal strip edge is given in the bar code. The bar codes may be read and evaluated by a subsequently-positioned cutter. Thus, individual adjustment of the cutter is possible for each image or group of images, so that accurate cutting of individual photographs is possible. In order to compensate for potential influences or thermal variations during transport of the strip-shaped photographic material that might lead to stretching or shrinking of the photographic material, machine-readable end-of-image markings that are placed exactly at the end of the image or group of images are projected in addition to the bar code markings. By reading the end-of-image markings, a correction of the data contained in the bar code is made regarding the position of the individual photographs or group of images. With the known device and the known method, inconvenient

calculations of individual positions at which the strip-shaped photographic material should be cut are necessitated by the correction of the data contained in the bar code by means of the end-of-image markings.

It is further generally known that test images with test information are projected onto the photographic material in order to calibrate the projection unit to project the image information at regular distances. Marks assigned to the test information and that contain additional information regarding the type of test information are projected onto the photographic material. These marks to designate the test information are usually pressed by a punch press as holes in the photographic material. The marks might contain, for example, information regarding the format of the photographic material or the time during which the test information is projected onto the photographic material. By means of the test information, projection of image information by the projection unit may be improved in that the projection unit settings may be checked and revised. Paper consumption is increased by punching the markings to designate the test information. Further, trash is generated by the punching of the photographic material, which is a drawback.

The present invention has the objective of enabling a simple and efficient generation of images and marks on strip-shaped photographic material, and thus to enable an effective generation of images.

This object is achieved by the technical lessons presented in Patent Claims 1, 4, 13, 14, 15, or 18.

Because of this invention, both the image information assigned to several pictures and the marks directly useable for cutting the strip-shaped photographic material may be projected via one and the same projector unit. Thus, two functions relevant to the generation of the images might be simply performed by one and the same projector unit. Using the projector unit, the marks used for cutting can be projected very accurately with respect to the projected image information. During the subsequent cutting step, the strip-shaped photographic material may be cut into individual photographs with very little paper waste. Particularly, an inefficient calculation by means of inconvenient correction steps is not required.

Further, based on this invention, along with image information assigned to several pictures, both test data by

means of which the projection of image information may be monitored, and marks that are to be used to designate the test data may be projected onto the strip-shaped photographic material by means of the same projector unit. Here also, more functions relevant to the generation of images may be implemented in a simple manner by means of one and the same projector unit. It is thus easily possible to perform a check of the projection of image information, and thus to ensure good quality during image generation.

In a particularly advantageous embodiment of the invention, the marks used for cutting that are projected onto the strip-shaped photographic material by the projector unit may be configured as so-called encoded marks. Such encoded marks contain additional information that may be used for image generation. Such additional information on the strip-shaped photographic material is particularly advantageous for management and order processing in a photo-finishing laboratory in which such images are generated. Such additional information may be, for example, an order identification number for the designation of each strip-shaped photographic material. The encoded marks may also be configured as beginning-of-order or end-of-order marks. With the beginning-of-order or end-of-order marks, the

first image of an order or the last image of an order may be designated. Beginning-of-order or end-of-order marks may be used in a sorting step subsequent to the cutting process to sort the individual cut images. Various information may be included in such an encoded mark, which can significantly simplify image generation.

In another advantageous embodiment of the invention, the marks used to designate test data might contain at least all information that enables identification of the device by which the test data and the mark were projected onto the strip-shaped photographic material. Thus, a clear assignment of the output test data to the device that produced the test data is ensured.

In a further, particularly advantageous embodiment of the invention, both the marks useable for cutting that may also be used to designate test data, and the test data itself may be projected via one and the same projector unit. The projector means may therefore be used within the device based on the invention for the particularly effective generation of images. Additional projector units to which the functions of the device, and thus the output of the

various marks and data, may be distributed are thus not required.

Based on the invention, it is also possible to provide several devices to create images in one system. Each of these devices is thus in the position to project test data onto the strip-shaped photographic material. The system based on the invention contains an evaluator to evaluate these various test data. This evaluator can preferably be used to evaluate test data originating from these various devices. Based on test data contained in the marks to designate the test data, a clear assignment of test data to the particular device that projected those particular test data onto the photographic material may result.

In a particularly advantageous embodiment of the system based on the invention, the various devices used to generate images and the evaluator are connected together via a network. The system based on the invention may additionally contain a controller with which adjustment of image information projection may be controlled by the various system devices based on the evaluated test data.

For the sake of simplicity, the projector unit includes lasers with which both image information and the marks are projected onto the photographic material. Such lasers may be very accurately controlled so that the insertion of marks may be very accurately adapted to the insertion of image information. Each mark used for cutting may particularly be projected onto the image inter-frame strip of the strip-shaped photographic material that is positioned between two adjacent images on the photographic material. The cutting mark may thus be directly projected onto the border of a projected image, or of one to be projected.

Further advantageous embodiments of the invention may be derived from the dependent claims. In the following, the invention and its advantages are described using embodiment examples and the illustrations, which show:

Figure 1 an embodiment of the invention in a system used to generate images,

Figure 2 an example of a section of strip-shaped photographic material onto which the marks are projected,

Figure 3 a further example of the strip-shaped photographic material onto which the marks are projected that are configured as encoded marks,

Figure 4 a third example of the strip-shaped photographic material onto which test data and a mark to designate the test data are projected, and

Figure 5 an embodiment of a system to generate images based on the invention.

In the following, the same elements, or those performing the same function, are designated using consistent reference indices.

Figure 1 shows an embodiment of a system 10 to generate photographic images. With this system, image information available in the form of digital image data are projected onto photographic paper 22. The photographic paper 22 here represents the strip-shaped photographic material that is wound in rolls. To expose the photographic paper 22, the system 10 includes a printer 20 with a digital exposure unit 13 to which the digital image data are added to the image information to be projected. In this embodiment, the



exposure unit 13 contains lasers by means of which three laser beams are created in the red, green, and blue spectral ranges. These laser beams are modulated with the image information using a list modulator. The exposure unit 13 here represents a projector unit to project the image information. Other exposure means, such as LED's, for example, may be used as such a projector unit. It is also possible to use ink jets as the projector unit to project image information. Paper may be imprinted using such ink jets. This paper is preferably configured for receiving such ink. Both exposure units such as lasers and printing units such as ink jets should be included under the concept "projector unit to project image information onto the strip-shaped photographic material."

The strip-shaped photographic paper 22 wound in rolls is available in a cassette that is coupled to the printer 20. The strip-shaped photographic paper 22 is supplied to the printer in a transport device A. A first pair of transport rollers 11 is positioned behind the entry to the printer 20 that includes two rollers mounted one above the other so that they may rotate, between which the strip-shaped photographic paper 22 passes. The photographic paper 22 is transported into the printer 20 toward the exposure unit 13

by means of the pair of transport rollers 11. The pair of transport rollers 11 is connected with a controller 15 by means of which the entire procedure of generating an image within the printer 20 based on the device may be controlled. The pair of transport rollers 11 receives individual control signals from the controller 15 with which the transport speed of the photographic paper 22 may be adjusted.

Below the exposure unit 13, a paper stage 12 is positioned within the printer 20. This paper stage 12 serves to guide the photographic paper 22 during exposure by means of the exposure unit 13. A second pair of transport rollers 14 is positioned at the exit from the printer that also includes two rollers mounted so that they may rotate and serve to transport the strip-shaped photographic paper 22. The pair of transport rollers 14 is also connected with the controller 15, and receives control signals from it to adjust the rotational speed of the rollers, and thus the transport speed of the photographic paper 22.

The printer 20 further includes an input device 21 through which the digital image data may be provided to the printer with the image information to be projected. Digital image

data with image information may originate from a conventional scanner that reads the image information from individual photographs on a photographic film and transforms it into digital image data. It is also possible, however, that the digital image data be stored on diskettes, CD-ROM, etc., and that the input interface 21 might include a corresponding reader to read such a medium. Further, the input interface 21 may be connected with a public data network such as the Internet, for example, by means of which the digital image data might be supplied directly to the printer 20 from a remote input station connected to the Internet. The input interface 21 is connected with the controller 15, and passes on the digital image data, and any accompanying data, to the controller 15. Such accompanying data might, for example, include the desired format for the generation of the images. The controller 15 preferably prepares the image data received at the input interface 21. By means of this preparation, the exposure may be adapted by means of the exposure unit 13 to the properties of the photographic paper used.

The controller 15 is connected via a connection line 27 with the exposure unit 13. The controller 15 transfers the prepared images via this line 27 to the exposure unit 13.

Since the prepared image data contain exactly that image information that is to be projected onto the strip-shaped photographic paper 22, the laser beams emitted from the exposure unit 13 are modulated by this image information. The controller 15 is connected with the exposure unit 13 via an additional connection line 28. The exposure unit 13 receives control signals via this additional line 28 that serves to project marks onto the strip-shaped photographic paper 22 by means of the exposure unit 13. These marks are used for subsequent cutting of the photographic paper 22 into individual photographs. The connection lines 27 and 28 may also be implemented as a single connection between the controller 15 and the exposure unit 13. Both the image data to be projected and the control signals for the projection of the marks may be transferred via this single connection from the controller 15 to the exposure unit 13.

The control signals generated by the controller 15 and passed to the exposure unit 13 via the additional connection line 28 for the projection of the marks are so transferred that immediately after projection of the image information, the mark is directly projected onto the edge of the exposed latent image. By means of this direct adaptation of the marks with the exposure of the image onto

the strip-shaped photographic paper 22, only a very narrow inter-frame strip is created between two latent images projected onto the photographic paper 22. Two adjacent latent images generated can basically be projected directly adjacent each other, since the marks used for cutting may be made very narrow. The exposure unit 13 is in the position to create such a narrow mark on the photographic paper 22. Correspondingly, a cutter device, which serves for the subsequent cutting of the strip-shaped photographic paper 22, must be able to discern this narrow mark accurately. It may thus be ensured that cutting into individual photographs loses none of the image information available at the margins of the images projected onto the strip-shaped photographic paper 22. It is alternatively also possible to project the marks used for cutting first, and then to project the accompanying image via the exposure unit 13.

After the printer, a development device in the form of a photographic paper developer 16 is positioned, by means of which the exposed photographic paper 22 may be developed. The latent images contained in the photographic paper 22 are fixed in the developer 16 so that a large number of individual photographic images are contained on the strip-

shaped photographic paper 22 at the output of the developer 16.

A cutting device 17 with which the strip-shaped developed photographic paper 22 may be cut into individual photographs is positioned along the paper transport direction and after the photographic paper developer 16. For this, the photographic paper 22 exiting from the developer 16 is fed into the cutting device 17. An additional pair of transport rollers 19 positioned directly before the cutter 17 serves to transport the strip-shaped photographic paper within the cutter 17. The cutting device 17 contains a cutter 18 with which the strip-shaped photographic paper 22 may be longitudinally and latitudinally cut. The desired photographs are cut from the strip-shaped photographic paper 22 by the cutter 18. The cutter 18 is here a single-blade cutter with which the strip-shaped photographic paper 22 may be cut at exactly the position where the mark is located on the photographic paper 22. The cutter 18 may be a single-blade cutter here, since the mark is very narrow, so that essentially no image inter-frame strip is present between two adjacent images on the photographic paper 22. The cutter 18 may also be a two-blade cutter capable of making a double cut by means of

which the entire mark and any borders present may be cut away.

A sensor 24 is positioned between the transport roller pair 19 and the cutter 18. This sensor 24 serves as the detector to detect the marks projected by the exposure unit 13 onto the photographic paper 22. The developed strip-shaped photographic paper 22 is passed adjacent to the sensor 24. If the sensor 24 detects a hole or mark, this information is used to cut the photographic paper 22 by means of the cutter 18. The sensor 24 is preferably positioned directly before the cutter 18 so that the cutting process is registered as accurately as possible with the recognized position of the mark. Since the exposure of the image information is very accurately registered with the exposure of the mark by the exposure unit 13 within the printer 20, such registration of the cutting with the detection of the mark within the cutting device 17 may lead to optimal use of the photographic paper 22 during the projection of multiple images. The paper loss encountered during cutting the photographic paper 22 into individual photographs that may arise from the cutting away of the borders and marks may thus be kept very small. With very accurate positioning of the marks projected by the exposure unit 13, it is

possible to emplace the individual photographs directly at the marks during exposure via the exposure unit 13. With properly accurate detection of the mark within the cutting device 17, the strip-shaped photographic paper 22 may be cut so exactly that it is no longer necessary to have to cut away a portion of the image information on the margin of an individual image in order to avoid an undesired image border. The sensor 24 may be configured in many ways, so long as it is ensured that the marks may be recognized with a high degree of reliability. The detector within the cutting device 17 is adapted to the type of the marks projected onto the photographic paper 22 by the exposure unit 13.

The individual photographs created by the cutting device 17 are now transported out of the cutting device 17 and passed to a sorting device 25 via another pair of transport rollers. The individual photographs are sorted in this sorting device 25. For this, the sorting device 25 includes several sorting compartments 26a, 26b, and 26c in this embodiment, as Figure 1 shows. Individual photographs are distributed to the sorting compartments 26a, 26b, and 26c by the sorting device 25 (not shown in detail). Distribution of the individual photographs depends on



information that is passed to the sorting device 25. The sorting device 25 is connected with the cutting device 17 in order to receive this additional information. It is also possible to connect the sorting device 25 to the controller 15 and to pass the additional information to the sorting device 25 via the controller 15. This additional information used to sort the individual photographs might be order-specific data. All photographs from the same order might be distributed into the same sorting compartment, for example.

The additional information used in the sorting device 25 to sort the individual photographs is preferably already contained in the marks. Such marks are designated as so-called encoded marks, which are widely known. In this embodiment, these encoded marks are already projected onto the photographic paper 22 by means of the exposure unit 13. The encoded marks are also used to cut the strip-shaped photographic paper 22 into individual photographs by the cutting device 17, and to sort the individual photographs within the sorting device 25. The encoded marks may particularly be configured as beginning-of-order or end-of-order markings. Such a beginning-of-order mark is placed before or after the first image of the order to be exposed,

and the end-of-order mark may be placed before or after the last image of that order. The beginning-of-order or end-of-order mark is detected by the sensor 24 within the cutting device 17, and the information regarding the detection of the proper mark is then passed to the sorting device 25. In this manner, all photographs of a specific order may be distributed into the same sorting compartment 26a, 26b, or 26c of the sorting device 25. The encoded marks projected onto the photographic paper 22 might also contain other information that might, for example, be used for procedure control within the photo-finishing laboratory in which the system to generate images as shown in Figure 1 is used.

Figures 2 and 3 show two examples of marks projected onto strip-shaped photographic paper that may be used to cut the photographic paper. Figure 2 shows the first example of a portion of a strip-shaped photographic paper 30 as described for Figure 1 that was exposed with image information assigned to individual photographs. In the portion of the strip-shaped photographic paper 30 shown in Figure 2, three marking sections 35a, 35b, and 35c are shown. A cutting mark 34 is projected onto photographic paper within each of these three marking sections 35a - 35c. These cutting marks 34 are projected onto the

photographic paper 30 within the marking sections 35a - 35c at the upper edge of each exposure unit 13.

Sectional areas are defined by the marks 34 projected onto the three marking sections 35a - 35c that are used for the projection of image information of an image by means of the exposure unit 13. A first sectional area 31 is shown to the right of, and adjacent to, the first marking section 35a that is to be used, or has already been used, for the exposure of the  $(n-1)$  image of a specific order  $k$ , depending on whether each mark 34 is projected before or after projection of the image information.  $n$  thereby corresponds to the number of images contained in the order. A second sectional area 32 is shown to the left of, and adjacent to, first marking section 35a on the strip-shaped photographic paper 30 that is used for the projection of an  $n^{\text{th}}$  image of order  $k$ . The second sectional area 32 is formed by the first marking section 35a and the second marking section 35b. The second sectional area 32 has a length  $b$ . A third sectional area 33 is present to the left of, and adjacent to, the second marking section 35b, and the mark 34 contained within it. This third sectional area 33 serves to project the first image of a following order  $(k + 1)$ . The third sectional area 33 is formed by the second marking

section 35b and the third marking section 35c. The third sectional area 33 has a length of c.

The marks 34 here are each a round mark. They have a specific size by means of which the length of each marking section 35a - 35c is essentially determined. In this embodiment example per Figure 2, the marking sections 35a - 35c each have a length a. The marking sections 35a - 35c are not used for the projection of image information. Rather, the marking sections 35a - 35c are cut away after projection of the image information in the printer 20 with the cutting device 17. The marking sections 35a - 35c that have been cut away thereby represent waste. Based on this invention, both the projection of the marks and the cutting of the photographic paper 22 may be registered very exactly with the position of each image. The amount of waste generated during the generation of images may therefore be minimized.

Another mark 39 is projected onto the lower border of the first marking section 35a that is also configured as a round hole. This mark 39 serves as the end-of-order mark. The last photograph of an order is designated with the end-of-order mark 39. In this example, the second sectional

area 32 is that area on the photographic paper 30 that serves for the exposure of the last image  $n$  of the order  $k$ . During subsequent sorting of the individual photographs within the sorting device 25 (Figure 1), the previously-detected end-of-order mark 39 is used to direct the exposed image in the second sectional area 32 as the last photograph distributed to the sorting compartment 26a, 26b, or 26c into which the previously-generated images of order  $k$  have been sorted. Using the end-of-order mark can ensure that the image projected onto the third sectional area 33 is distributed to a different sorting compartment by the sorting device 25. In this manner, images from different orders may be easily identified and sorted separate from one another.

Figure 3 shows another example of a section of the strip-shaped photographic paper 30 onto which several marks used for cutting are projected. The marks shown in Figure 3 are configured as so-called encoded marks. A first encoded mark 36 is projected onto the first marking section 35a. This first encoded mark 36 contains a rectangular, extended mark in the upper area of the first marking section 35a. The first encoded mark 36 contains a round mark in the center area of the first marking section 35a, and a rectangular,

short mark in the lower area. A second encoded mark 37 is projected onto the second marking section 35b. This second encoded mark 37 also contains a rectangular, extended mark in the upper third of the second marking section 35b. A rectangular, short mark is projected onto the lower third to the marking section 35b. The third marking section 35c contains a third encoded mark 38. This contains a rectangular, extended mark in the lower third of the third marking section 35c.

The positions of marks 34 - 38 are determined by the controller 15 of the system to generate images based on the invention. The controller 15 encompasses the length required for the projection of the pertinent image onto the photographic paper 30.

Figure 4 shows a third example of a section of the strip-shaped photographic paper 30. Several marks that are used for cutting are projected onto this section of the strip-shaped photographic paper 30, as in Figure 2. The information and marks projected onto the section shown were projected onto the photographic paper 30 by means of the printer 20 shown in Figure 1 and described with Figure 1. Three marking sections 50a, 50b, and 50c are shown in the

section of the strip-shaped photographic paper 30 shown in Figure 4. One cutting mark 34 is projected onto each of these three marking sections 50a, 50b, and 50c. These cutting marks 34 are projected onto the strip-shaped photographic paper 30 within the marking sections 50a - 50c at each top border by the exposure unit 13 (Figure 1).

The marks 34 projected into the three marking sections 50a - 50c define partial areas that serve for the projection of image information of an image or test information to check the projected image information by means of the exposure unit 13. A partial area 51 is shown to the right, next to first marking section 50a, that is to be used for the projection of an image  $i$  of a specific order  $j$ , or has already been used for this, depending on whether each mark 34 was projected onto the photographic paper 30 before or after the image information of the image  $i$ . Another partial area 52 is present on the strip-shaped photographic paper 30 to the left, next to the first marking section 50a. This additional partial area 52 is divided into a first, lower section 55 and a second, upper section 56. Test information 57 is projected onto the second, upper section 56. The test information 57 contains various gray-scale shades 58 - 66 that are projected into the second section 56 as adjacent

rectangles. The first gray-scale shade 58 positioned at the left edge of the partial area 52 is the lightest gray-scale shade, and the gray-scale shade 66 positioned at the right edge of the partial area 52 is the darkest gray-scale shade. The various gray-scale shades 58 - 66 are positioned directly adjacent to each other, with brightness decreasing from right to left.

The test information 57 serves to check the function of the printer 20 and the photographic paper developer 16 positioned after the printer (Figure 1). The degree of effectiveness of particularly the chemical reagents present in the developer that are used to develop and fix the photographic paper changes in the course of on-going production. An evaluation of the test information 57 that has passed through the developer and fixing baths may serve as a basis for correction of the exposure of the photographic paper 30 when the image is generated by means of the exposure unit 13. It is possible via the controller 15 to alter the exposure via the exposure unit 13 correspondingly if the evaluation results of the evaluation of the test information 57 are passed to the controller 15. Exposure parameters for the projection of images via the



exposure unit 13 may be adapted to the altered reaction of the developer and fixer baths in the developer 16.

A mark 54 to designate the test information 57 is projected onto the first section 55 of the partial area 52. In this embodiment, this mark 54 is configured as a bar code. It is equally possible to configure the mark 54 to designate the test information 57 in another manner, e.g., as an encoded mark as described for Figure 3. The bar code 54 here contains information used to identify the printer 20 with which a reference is established between the test information 57 and the exposure unit 13 or the printer 20 that projected the test information 57. The bar code may further contain information regarding the format of the photographic paper 30 or the time during which the test information was projected onto the photographic paper 30.

The partial area 52 is defined by the marking section 50a and the marking section 50 b adjacent to its left. The partial area 52 has a length d. A third partial area 53 is present on the strip-shaped photographic paper 30 to the left of the marking section 50b and of the mark 34 contained within it. This third partial area 53 (as does the first partial area 51) serves to project an image  $i + 1$

of a specific order. This image  $i + 1$  to be projected in the third partial area 51 may belong to order  $j$  as did image  $i$  that was projected into the first partial area 51. In this case, the test information 57 and the bar code 54 are projected between two images that belong to the same order  $j$ . It is equally possible to append the test information 57 and the bar code 54 directly to the end of an order. In this case, the image to be projected into the third partial area 53 would belong to different order  $m$  than the image  $i$ . The third partial area 53 is formed by the marking section 50b and the marking section 50c to the left of the partial area 53. The third partial area 53 here has a length  $e$ . In the case in which the test information 57 and the bar code 54 are appended to the end of the order, an end-of-order mark may be projected in the marking section 50b at the lower edge of the strip-shaped photographic paper 30. It is also equally possible to project a beginning-of-order mark in the marking section 50a. This beginning-of-order mark is preferably projected onto the lower edge of the photographic paper 30, as was done with the end-of-order mark projected into the marking section 50b. The marks 34 in this embodiment per Figure 4 are each a round mark. They correspond to the marks that

were previously described for the embodiment per Figure 2.

The marking sections 50a - 50c each have a length a.

Figure 5 shows an embodiment of a system 140 based on the invention. This system 140 contains, in addition to the system 10 to generate images as described in the embodiment per Figure 1, two other systems 70 and 80 for the generation of images that are constructed the same as the system 10 and that may perform the same functions. Both systems 70 and 80 are also connected to a network 100, as is system 10. This network 100 may be, for example, a public communication network such as the Internet, or other network not accessible by the public such as a Local Area Network (LAN).

The system 70 contains, among other things, a printer 71 by means of which image information may be projected to generate an image. This also applies for the third system 80 that includes a printer 81. The design of the printers 71 and 81 corresponds to that of the printer 20 of the system 10. The outputs of the systems 10, 70, and 80 are each connected with a sorting device 90. The photographs produced by the systems 10, 70, and 80 may be so sorted by the sorting device 90 that photographs of one order that

were distributed to various systems 10, 70, or 80 for exposure may again be collected together.

Along with the systems 10, 70, and 80, an evaluator 130 and a detector 120 are connected to the network 100. The evaluator 130 serves to evaluate the test information projected onto the photographic paper 30 from the systems 10, 70, and 80. The evaluator 130 may particularly be a densitometer. Densitometers are measurement devices with which particularly the optical density of the test information projected onto the photographic paper 30 may be determined. The detector 120 connected directly evaluator 130 issues the bar code assigned to the test information. The detector 120 here is a bar-code scanner. The information read from the evaluator 130 and the detector 120 are passed to a controller 110 that is connected both with the network 100 and with the evaluator 130. The controller 110 controls information issued by the evaluator 130 and the detector 120 so that the printers 20, 71, and 81 used to project the image information may be adjusted in dependence upon the evaluated test information and the assignment received from the bar code for the printers 20, 71, and 81. It is thus ensured that each printer 20, 71,

and 81 is only adjusted based on the test information that is projected by them onto the photographic paper.

In the embodiments per Figures 4 and 5, it was described how the mark 54 used to designate the test information 57 was projected by the exposure unit 13. This exposure unit 13 should project both the test information and the image information onto the photographic paper 30 that are required to generate the images for various orders. It is also equally possible to project the mark 54 onto the photographic paper 30 via another projection unit. The mark 54 may, for example, also be projected via a rear-side printer onto the rear side of the photographic paper 30.

Patent Claims:

1. Device (20) to generate images, with
  - a projector unit (13) to project image information assigned to several pictures onto strip-shaped photographic material (22) and
  - a controller (15) to generate control signals to project marks (34, 36 - 39) that may be used to cut the strip-shaped photographic material (22), and that indicate the direct cutting positions for the cut,characterized in that
  - the projector unit (13) receiving the control signals is connected with the controller (15), and
  - the projector unit (13) is so configured that it also projects the marks (34, 36 - 39) that may be used for cutting and are dependent on the control signals onto the strip-shaped photographic material (22).
2. Device according to one of the previous claims, characterized in that the projector unit (13) is so equipped that it projects one or more marks that may be

used for cutting as encoded marks (36 - 39) onto the strip-shaped photographic material (22), and these encoded marks (36 - 39) contain additional information.

3. Device according to Claim 2, characterized in that the projector unit (13) projects at least one of the encoded marks (36 - 39) configured as a beginning-of-order or end-of-order mark (39) onto the strip-shaped photographic material (22), and that this mark (36 - 39) indicates the first or last picture of an order to be printed.

4. Device (20) to generate images with

- a projector unit (13) to project image information assigned to several pictures onto strip-shaped photographic material (22),

characterized in that

- the device includes a controller (15) to generate control signals to project marks (54) that may be used to designate test information (57), whereby the projection of image information may be monitored by means of the test information (57),

- the projector unit (13) receiving the control signals is connected with the controller (15), and
- the projector unit (13) is so configured that it also projects both the test information (57) as well as the marks (54) that may be used to designate the test information (57) onto the strip-shaped photographic material (22).

5. Device as in Claim 4, characterized in that the marks (54) that may be used to designate test information (57) contain at least one piece of identifying information for the device (20).

6. Device as in Claim 4 or Claim 5, characterized in that the marks (54) that may be used to designate test information (57) contain at least one bar code.

7. Device as in one of claims 4 - 6, characterized in that the test information (57) contains various gray-scale shades.

8. Device as in one of claims 4 - 7, characterized in that the controller (15) is further configured to generate control signals to project marks (34, 36 - 39) that may be



used for cutting the strip-shaped photographic material (22), and that the projector unit (13) is so configured that it projects dependent on these control signals for the projection of marks (34, 36 - 39) that may be used for cutting the strip-shaped photographic material (22) in addition to the marks (34, 36 - 39) that may be used for cutting.

9. Device as in one of the previous Claims, characterized in that the projector unit (13) projects the image information row by row.

10. Device as in one of the previous Claims, characterized in that the projector unit (13) includes an exposure means to expose the light-sensitive photographic material.

11. Device as in Claim 10, characterized in that the projector unit (13) includes lasers.

12. Device as in one of the previous Claims, characterized in that it includes transport means (11, 14) to transport the strip-shaped photographic material (22), and that the projector unit (13) is so configured that the marks (34, 36 - 39) are accurately projected onto the strip-shaped photographic material (22) when the transport means (11,

14) transports the strip-shaped photographic material (22) into the area of the projector unit (13).

13. Device to generate images, in which:

- image information assigned to several pictures are projected from a projector unit (13) onto strip-shaped photographic material (22), and
- control signals used to project marks (34, 36 - 39) that may be used for cutting of the strip-shaped photographic material (22) and that exactly indicate the cutting positions for the cutting are generated by the controller (15),

characterized in that

- the control signals generated by the controller (15) are received by the projector unit (13), and
- the marks (34, 36 - 39) that may be used for cutting are projected onto the strip-shaped photographic material (22) dependent on the control signals from the controller (15).

14. Device to generate images in which

- image information assigned to several pictures is projected onto strip-shaped photographic material (22) by means of a projector unit (13),

characterized in that

- control signals for the projection of marks (54) that may be used to designate test information (57), whereby the projection of the image information may be monitored via the test information (57)
- control signals generated by the controller (15) are received by the projector unit (13), and
- both the test information (57) and the marks used to designate test information are projected onto the strip-shaped photographic material (22) by the projector unit (13) in dependence upon the control signals.

15. System (10) to generate images with

- a device (20) to generate images based on one of Claims 1 to 7 or on Claim 12,

- a detector (24) to detect marks (34, 36 - 39) projected onto strip-shaped photographic material (22) that may be used to cut the strip-shaped photographic material (22), and
- a cutter (17) to cut the strip-shaped photographic material (22) onto which the image information was projected into individual pictures, whereby
- the cutter (17) so configured that it cuts the strip-shaped photographic material (22) dependent on detection of the marks (34, 36 - 39) by the detector (24) directly at those positions at which the marks are projected onto the strip-shaped photographic material.

16. System as in Claim 15, characterized in that the detector (23, 24) is positioned in the area of the cutter (17).

17. System as in Claim 15 or 16, characterized in that it contains a sorter (25) to sort the individual pictures, and that sorts these individual pictures dependent on additional information in the encoded marks (36 - 39).

18. System (10) to generate images with

- a device (20, 71, 81) to generate images as in one of Claims 8 through 12,
- an evaluator (130) to evaluate the test information (57) projected onto the strip-shaped photographic material (22), and
- a detector (120) to detect the marks (54) projected onto the strip-shaped photographic material (22) that designate the test information (57), and
- an adjustor (15) to adjust the projection of the image information via the device (20, 71, 81) dependent on the evaluation of the test information (57) and the detection of the marks (54) used to designate the test information(57).

19. System (10) as in Claim 18, characterized in that it contains several devices (20, 71, 81) as in Claims 8 through 12.

20. System as in Claim 18 or 19, characterized in that the evaluator (130) is connected with the device or several devices (20, 71, 81) via a network (100).

21. System as in one of Claims 18 through 20,  
characterized in that the evaluator (130) is a  
densitometer.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum  
Internationales Büro



(43) Internationales Veröffentlichungsdatum  
15. März 2001 (15.03.2001)

PCT

(10) Internationale Veröffentlichungsnummer  
**WO 01/18601 A1**

(51) Internationale Patentklassifikation<sup>7</sup>: G03B 27/52

(21) Internationales Aktenzeichen: PCT/EP00/08759

(22) Internationales Anmeldedatum:  
7. September 2000 (07.09.2000)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:  
199 42 528.0 7. September 1999 (07.09.1999) DE

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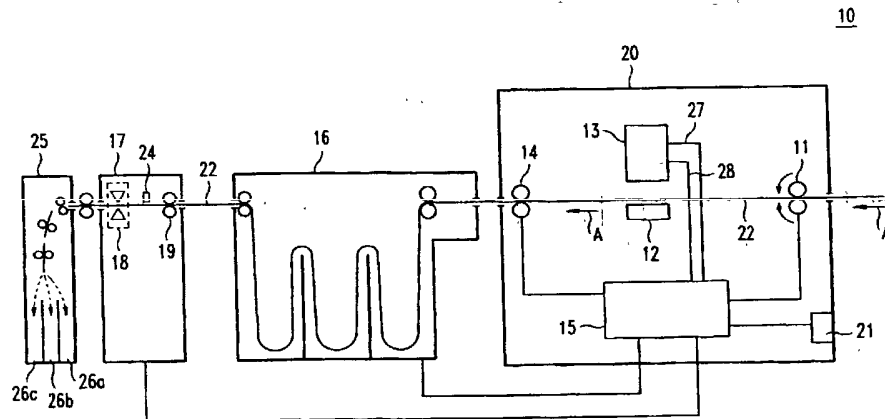
(84) Bestimmungsstaaten (regional): europäisches Patent (AT,  
BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,  
NL, PT, SE).

Veröffentlicht:  
— Mit internationalem Recherchenbericht

[Fortsetzung auf der nächsten Seite]

(54) Title: DEVICE, METHOD AND SYSTEM FOR GENERATING IMAGES

(54) Bezeichnung: VORRICHTUNG, VERFAHREN UND SYSTEM ZUM HERSTELLEN VON BILDERN



WO 01/18601 A1

(57) Abstract: The invention relates to a device (20) and method for generating images and to a system (10; 140) for producing images. The aim of the invention is to enable a simple and inexpensive generation of images and marks on strip-shaped recording material and thus to enable an effective production of images. To this end, an output unit (13) is provided for outputting image information onto strip-shaped recording material (22). The image information is assigned to a plurality of images. Drive signals for applying marks (34, 36-39) which can be used for a cutting of the strip-shaped recording material (22) can be generated by a control means (15). The invention also provides that marks (54) can be generated which serve to denote test information (57). This test information is used for verifying the output of the image information. The output unit (13) is connected to the control means (15) in order to receive the drive signals. The output unit (13) is configured in such a way that, according to the drive signals, it additionally applies marks (34, 36-39), which can be used for cutting, onto the strip-shaped recording material (22). The output unit (13) can additionally or alternatively output the marks (54), which denote the test information (57), and can output the test information (57) itself.

[Fortsetzung auf der nächsten Seite]

10

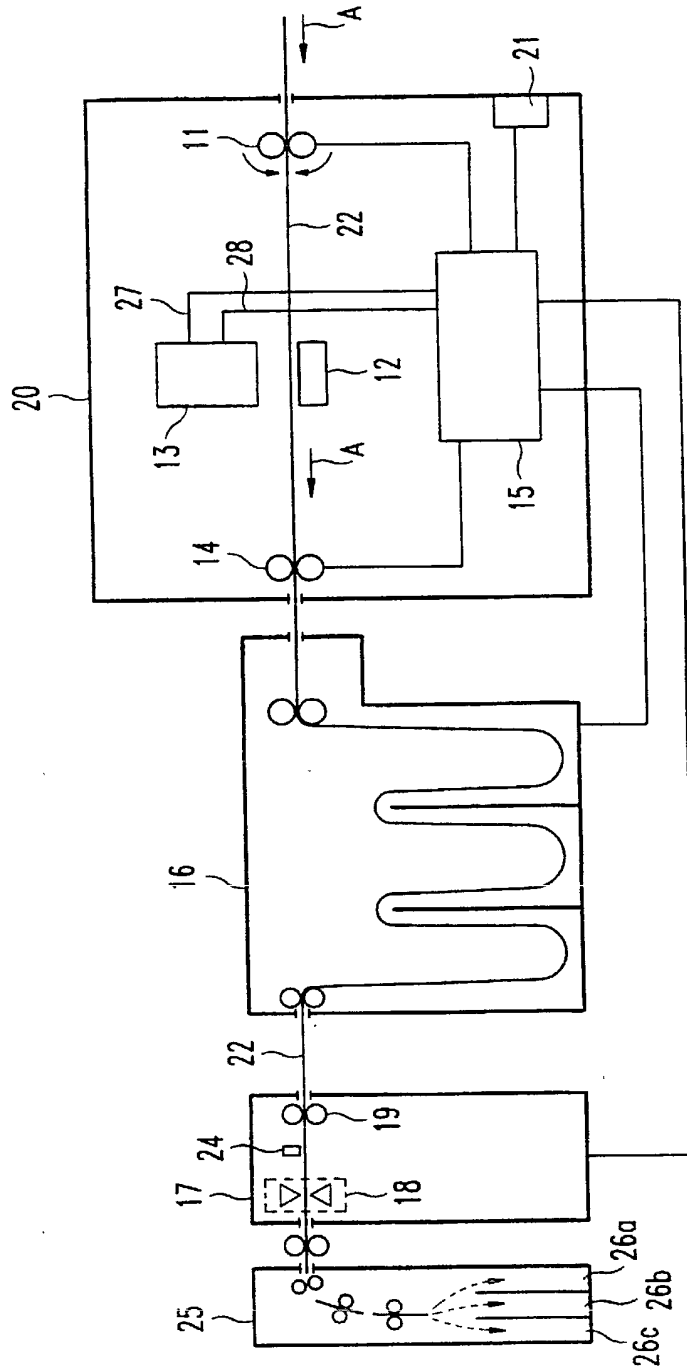
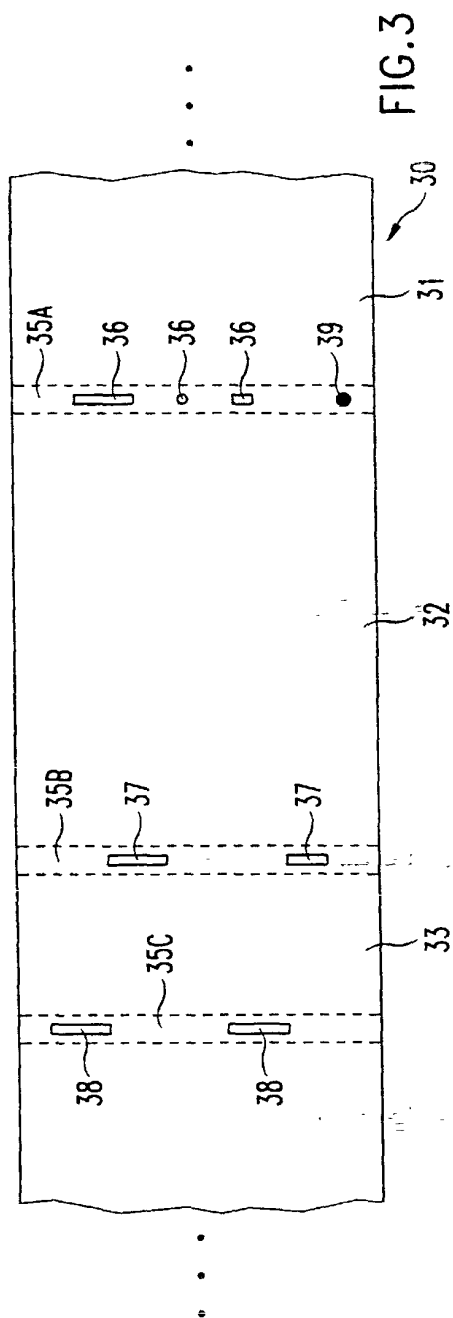
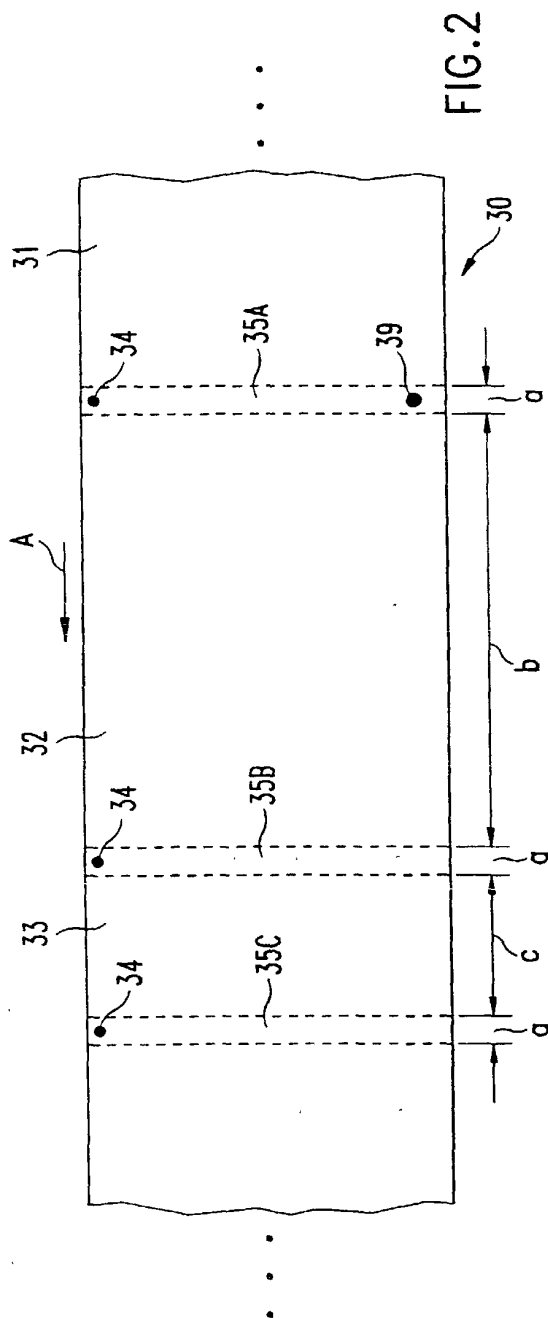


FIG.1





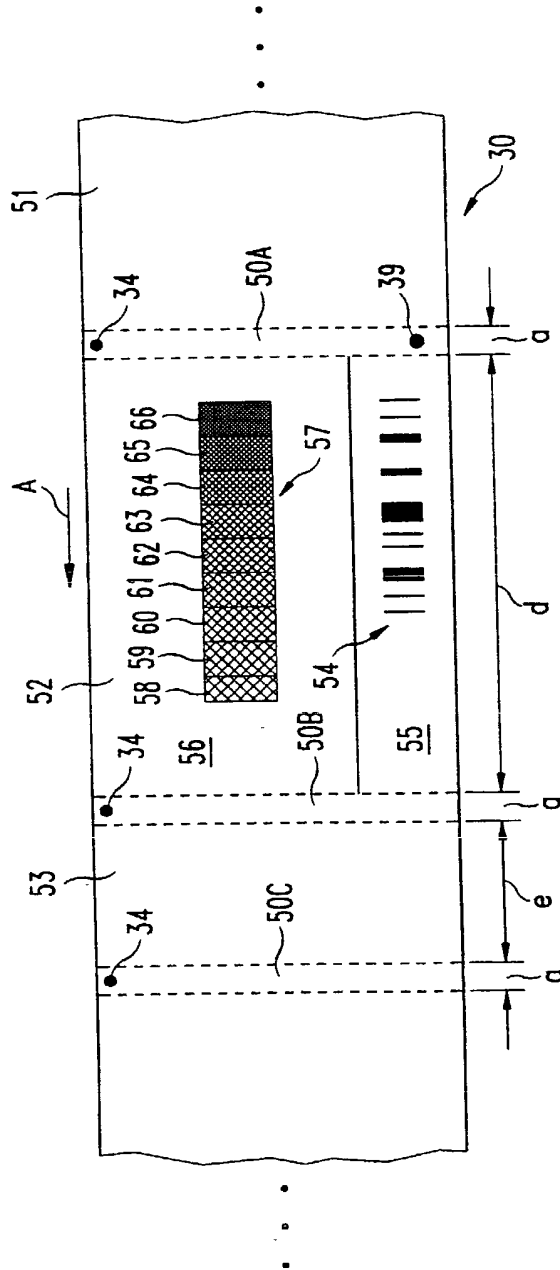


FIG. 4

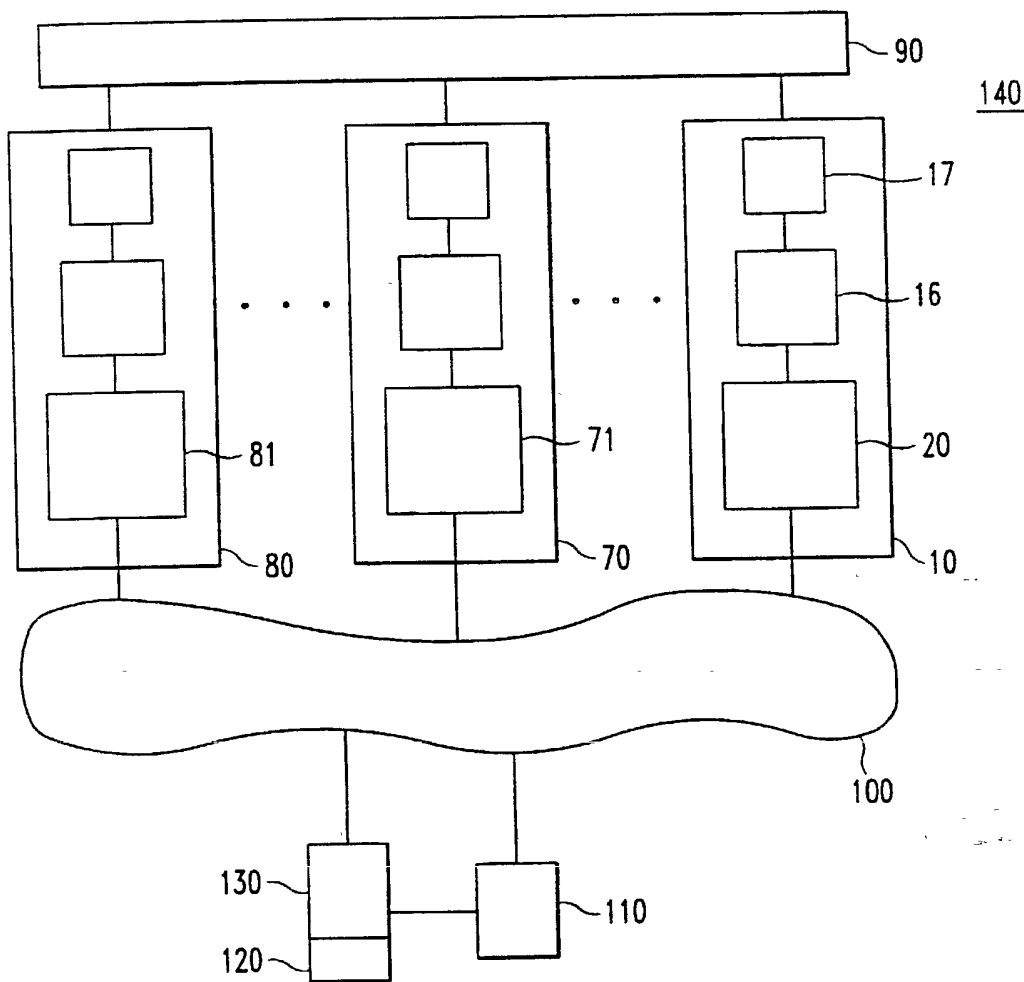


FIG.5

# DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Attorney Docket No.  
AGFA 250-KFM

As the below named inventors, I/We hereby declare that:

My/Our residence, post office address and citizenship is as stated below next to my/our name.

If one name appears below, I am the sole inventor of the subject matter sought to be patented.

If two or more names appear below, we are joint inventors of the subject matter sought to be patented.

I/We believe I/We am/are the original; and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

## DEVICE, METHOD AND SYSTEM FOR GENERATING IMAGES

the specification of which

☒ is attached hereto.

☐ was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_.

I/We hereby state that I/We reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I /We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I/We also acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.63(d), which occurred between the filing date of the prior application and the filing date of the continuation-in-part application, if this is a continuation-in-part application.

I/We hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for the patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application: PCT Application No. PCT/EP00/08759  
filed September 7, 2000

Priority Claimed: X Yes    No

Prior Foreign Application: GERMAN Application No. 199 42 528.0  
filed September 7, 1999

Priority Claimed:   X   Yes        No

I/We hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:


\_\_\_\_\_  
Application Serial No.

\_\_\_\_\_  
Filing Date

\_\_\_\_\_  
Status  
(patented, pending, abandoned)

I/We hereby declare that all statements made herein of my/our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I/We hereby appoint the following attorneys and/or agents to represent me with respect to the above identified U.S. Patent Application, and to prosecute any continuations, continuations-in-part, reissue applications and/or reexaminations with respect to these applications and to transact all business in the Patent and Trademark Office connected therewith, and hereby expressly revoke all prior powers, whatever they may be, heretofore had herein:

 Karl F. Milde, Jr., Reg. No. 24, 822 and Steven M. Hoffberg, Reg. No. 33,511,  
both of 10 Bank Street, Suite 460, White Plains, New York 10606, my/our  
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